

DAILY MATHS (20 Marks) (P1 + P2)

- ✓ 1- UNIT CONVERSION
- ✓ 2- RATIO
- ✓ 3- CURRENCY CONVERSION
- ✓ 4- PIE CHARTS
- ✓ 5- MAPS & SCALES
- ✓ 6- PERCENTAGES
- ✓ 7- INTEREST (SIMPLE & COMPOUND)

UNIT CONVERSION

→ unit conversion
→ Measurement
→ Kinematics.

Length mm $\xrightarrow{10}$ cm $\xrightarrow{100}$ m $\xrightarrow{1000}$ km

Mass g $\xrightarrow{1000}$ kg $\xrightarrow{1000}$ tons

Volume ml or cm³ $\xrightarrow{1000}$ litres $\xrightarrow{1000}$ m³

Time sec $\xrightarrow{60}$ min $\xrightarrow{60}$ hours

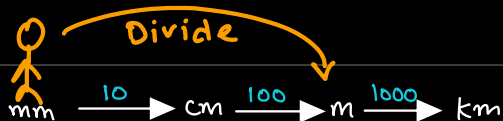
RULE:

Forward ÷

Backward X

Basic

Convert 40000 mm to m



$$\frac{40000}{1000} = 40m$$

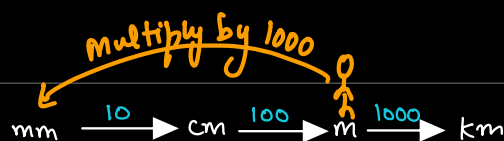
ADVANCED

1) $20000 \text{ cm}^2 \longrightarrow \text{m}^2$
Rule $\Rightarrow$ Divide by 100



$$\frac{20000}{(100)(100)} = 2 \text{ m}^2$$

2) $0.0002 \text{ m}^2 \longrightarrow \text{mm}^2$



$$0.0002 \times 1000 \times 1000 = 200 \text{ mm}^2$$

3) $20000 \text{ mm}^3 \longrightarrow \text{cm}^3$



$$\frac{20000}{(10)(10)(10)} = 20 \text{ cm}^3$$

Convert 0.03 m^3 to litre



$$0.03 \times 1000 = 30 \text{ litres}$$

Step 1: Ignore power and then develop rule.

Step 2: Apply the rule as many times as power.

RATIOS

Q. Express 20cm as a ratio of 4m. (1mark)

You cannot take ratio if units are different.

~~20 : 4~~ most common Blunder.

Step 1: Make units same and then divide.

20cm

4m

$\times 100$

400cm

20 : 400

$$\frac{\cancel{20}}{20\cancel{400}} = \frac{1}{20} = \boxed{1:20}$$

Q. In a class boys to girls ratio is 3:4.

If there are 12 girls, how many boys are there.

(1mark)

	(RATIO)	
	PARTS	ACTUAL
GIVEN: GIRLS	4	12
FIND: BOYS	3	x

$$4x = 12 \times 3$$

$$x = \frac{12 \times 3}{4} = 9 \text{ boys}$$

B : G

3 : 4

Boys = 3 parts

Girls = 4 parts

Total = 7 parts

Diff = 1 part.

Q: In a class boys to girls ratio is 5:7. If there are 20 boys, how many total students take class. (1 mark)

	RATIO	
	PARTS	ACTUAL
GIVEN: BOYS	5	20
FIND: TOTAL	12	x

$$5x = 12 \times 20$$

$$x = \frac{12 \times 20}{5} = 48 \text{ students}$$

B : G

5 : 7

B = 5 parts

G = 7 parts

T = 12 parts

D = 2 parts.

Q: In a class boys to girls ratio is 6:5. If there are 7 more boys than girls, how many girls are there (1 mark)

	PARTS	ACTUAL
GIVEN: DIFF	1	7
FIND: GIRLS	5	x

$$x = 7 \times 5$$

$$x = 35.$$

Q: In a class boys to girls ratio is 3:5
 If there are 12 more girls than boys,
 how many total students are there
 (1 mark)

	PARTS	ACTUAL
GIVEN: DIFF	2	12
FIND: TOTAL	8	x

$$2x = 12 \times 8$$

$$x = \frac{12 \times 8}{2}$$

$$x = 48.$$

- 41 (a) Some money is shared between Ali, Ben and Carl in the ratio 5 : 3 : 2. Total = 10
 Ben receives \$60.

A B C

How much money is shared?

	PARTS	ACTUAL
GIVEN: BEN	3	60
FIND: TOTAL	10	x

$$3x = 60 \times 10$$

$$x = \frac{60 \times 10}{3}$$

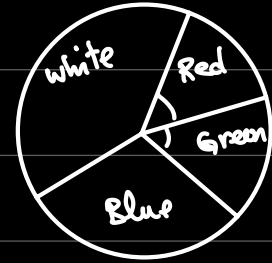
$$x = 200.$$

Answer \$ [1]

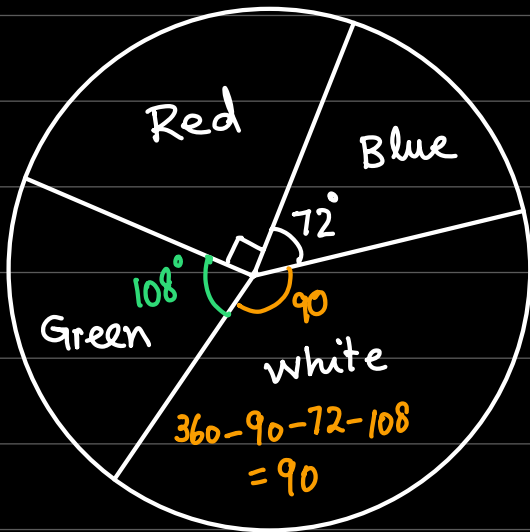
PIE CHARTS

~~Angle = $\frac{x}{\text{Total}} \times 360$~~ We don't like this formula.

	ANGLE	
	PARTS	ACTUAL
GIVEN:		
FIND:		



Memorize: TOTAL ANGLE = 360



Q: Colours of cars in a parking lot were recorded and a pie chart was constructed. Given that there are 12 blue cars.

(i) Find Total cars in parking lot

	ANGLE	
	PARTS	ACTUAL
GIVEN: BLUE	72	12
FIND: TOTAL	360	x

$$72x = 12 \times 360$$

$$x = \frac{12 \times 360}{72}$$

$$x = 60 \text{ cars}$$

(ii) Given that 18 green cars are there, find angle for green cars on pie chart.

	ANGLE PARTS	ACTUAL
GIVEN: BLUE	72	12
FIND: GREEN	x	18

$$12x = 72 \times 18$$

$$x = \frac{72^6 \times 18}{12}$$

$$x = 108$$

(iii) Find number of white cars.

	ANGLE PARTS	ACTUAL
GIVEN: BLUE	72	12
FIND: WHITE	90	x

oe = or equivalent

$$\frac{3}{2} = 1\frac{1}{2} = 1.5 \quad \text{all are correct}$$

cao = correct answer only
co = correct only.

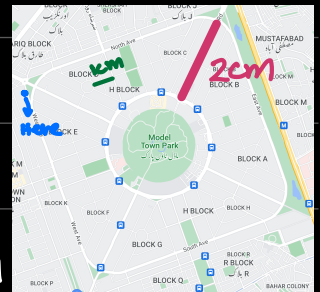
1.5 (co)

$$72x = 90 \times 12$$

$$x = \frac{90 \times 12}{72} = 15 \text{ cars}$$

MAPS & SCALES

On a map 2cm represents 5km



(i) Express this scale in the form 1:n (1mark)

Step 1: ALWAYS Bring everything to cm

$$\text{mm} \xrightarrow{10} \text{cm} \xrightarrow{100} \text{m} \xrightarrow{1000} \text{km}$$

Step 2: Divide, simplify and form ratio.

2cm

✓

5 km

$\times 100000$

500000 cm ✓

We do not use this scale in next parts

$$\frac{2^1}{500000} = \frac{1}{250000} =$$

$$\boxed{1 : 250000}$$

$$1 : n$$

- (ii) On the map two cities are 40cm apart.
Find distance between both cities in km.

	MAP	
	PARTS	ACTUAL
GIVEN: SCALE	2cm	5km
FIND: CITIES	40cm	x

$$2 \times x = 5 \times 40$$

$$x = \frac{5 \times 40}{2}$$

$$x = 100 \text{ km}$$

NOTE: UNITS MUST STAY SAME VERICALLY WHEN WE ARE WORKING FOR MAPS and SCALES.

- (iii) On the map a lake has area 8cm². Find its actual area in km².

LENGTH: 2cm → 5km

SQUARE EVERYTHING TO CONVERT TO AREA SCALE.

AREA: 4cm² → 25km²

	MAP	
	PARTS	ACTUAL
GIVEN: SCALE	4cm ²	25km ²
FIND: LAKE	8cm ²	x

$$4x = 25 \times 8$$

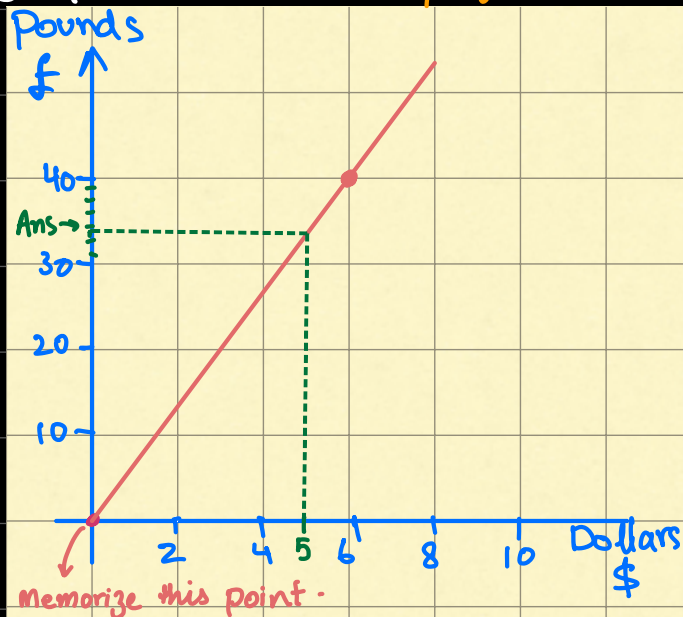
$$x = \frac{25 \times 8}{4}$$

$$x = 50 \text{ km}^2$$

CURRENCY CONVERSION

$$£40 = \$6$$

ii) On the grid below draw a currency conversion graph. (currency graph is always straight line)



(ii) use your graph to find pounds in return for \$5.

Second point on a currency graph is always origin (0,0)

Q. P2

$$£1 = \$3$$

$$£1 = \text{PKR } 180$$

i) Ali converts 80 dollars to pounds, how many pounds will he get?

$$\begin{array}{cc} £ & \$ \\ 1 & 3 \\ x & 80 \end{array}$$

$$3x = 80$$

$$x = \frac{80}{3} = 26.667 \text{ pounds.}$$

ii) Ali converts 5 pounds to rupees. How many rupees will he get?

$$\begin{array}{r} \text{£} \quad \text{PKR} \\ 1 \times 180 \\ 5 \times x \end{array}$$

$$x = 180 \times 5$$

$$x = 900 \text{ rupees}$$

(iii) Ali converts 3600 rupees to dollars.
How many dollars will he get. (1 mark)

$$\begin{array}{l} \text{£} 1 = \$ 3 \\ \text{£} 1 = \text{PKR } 180 \end{array}$$

$$\$ 3 = \text{PKR } 180$$

$$\begin{array}{r} \$ \quad \text{PKR} \\ 3 \times 180 \\ x \times 3600 \end{array}$$

$$180x = 3 \times 3600$$

$$x = \frac{3 \times 3600}{180} = 60 \text{ dollars}$$

WHAT IF LEFT SIDES ARE NOT SAME!

$$\text{£} 3 = \$ 60$$

$$\text{£} 2 = \text{PKR } 400$$

$$\frac{\text{£} 3}{3} = \frac{\$ 60}{3}$$

$$\frac{\text{£} 2}{2} = \frac{\text{PKR } 400}{2}$$

$$\text{£} 1 = \$ 20$$

$$\text{£} 1 = \text{PKR } 200$$

Now LHS is same. We can write third currency rate

$$\$ 20 = \text{PKR } 200$$

PERCENTAGES

$$\frac{40}{50}$$

$$\text{Percentage Marks} = \frac{\text{obtained marks}}{\text{Total marks}} \times 100 = \frac{40}{50} \times 100 = 80\%$$

$$\frac{42}{50}$$

$$\text{Percentage increase} = \frac{\text{increase}}{\text{original (old)}} \times 100 = \frac{2}{40} \times 100 = 5\%$$

$$\frac{39}{50}$$

$$\text{Percentage decrease} = \frac{\text{decrease}}{\text{original (old)}} \times 100 = \frac{1}{40} \times 100 = 2.5\%$$

BUYING / SELLING

1



For Acct / Buss ppt
Profit — margin
 — mark-up
 — maths.

$$\text{Percentage Profit} = \frac{\text{Profit}}{\text{original (old)}} \times 100 = \frac{10}{40} \times 100 = 25\%$$

2



$$\text{Percentage Loss} = \frac{\text{Loss}}{\text{original (old)}} \times 100 = \frac{5}{40} \times 100 = 12.5\%$$

original(old)

40

3



Before Discount = (List price) (Marked Price)

After discount = Sale Price.

Discount = 30

$$\text{Percentage Discount} = \frac{\text{Discount}}{\text{original (old)}} \times 100 = \frac{30}{180} \times 100 = 16.67\%$$



PERCENTAGES

DATA GIVEN
FIND PERCENTAGE

PERCENTAGE GIVEN
DATA MISSING

Use formula.

$$\% \square = \frac{\square}{\text{original (old)}} \times 100$$

	Before	After
%	100	

Q. In a city population was 80000 in 2012. It rose by 20% in 2018. Find population in 2018.

	Before	After
	2012	2018
%	100 $\xrightarrow{+20}$	120
population	80000	x

$$100x = 120 \times 80000$$

$$x = \frac{120 \times 80000}{100}$$

$$x = 96000.$$

Q. In a city population was 65000 in 2015. It was 30% more than population in 2014. Find population in 2014.

	Before	After
	2014	2015
%	100 $\xrightarrow{+30}$	130
popul.	x	65000

$$130x = 65000 \times 100$$

$$x = \frac{65000 \times 100}{130}$$

$$x = 50000.$$

Q: A shopkeeper buys an item for \$50, keeps a profit of 10% and sells it. Find the selling price.

	Before	After
	COST	SELL
%	100 $\xrightarrow{+10}$ 110	
\$	50	x

$$100x = 110 \times 50$$

$$x = \frac{110 \times 50}{100}$$

$$x = 55$$



Q: In a sale everything is 10% off. An item has sale price of \$18, Find its marked price.

	Before	After
	MARKED	SALE
%	100 $\xrightarrow{-10}$ 90	
\$	x	18

$$90x = 100 \times 18$$

$$x = \frac{100 \times 18}{90}$$

$$x = 20$$



Tax is charged at 10%

↓
This does not mean
ADD / SUB. This only
tells percentage.

- (b) Tax on the original price of a radio is charged at 20% of the original price.
After tax was included, a customer paid \$60 for the radio.

ADD.

Calculate the tax charged.

	Before	After
%	100 → 120	
\$	x ↓ 50	60

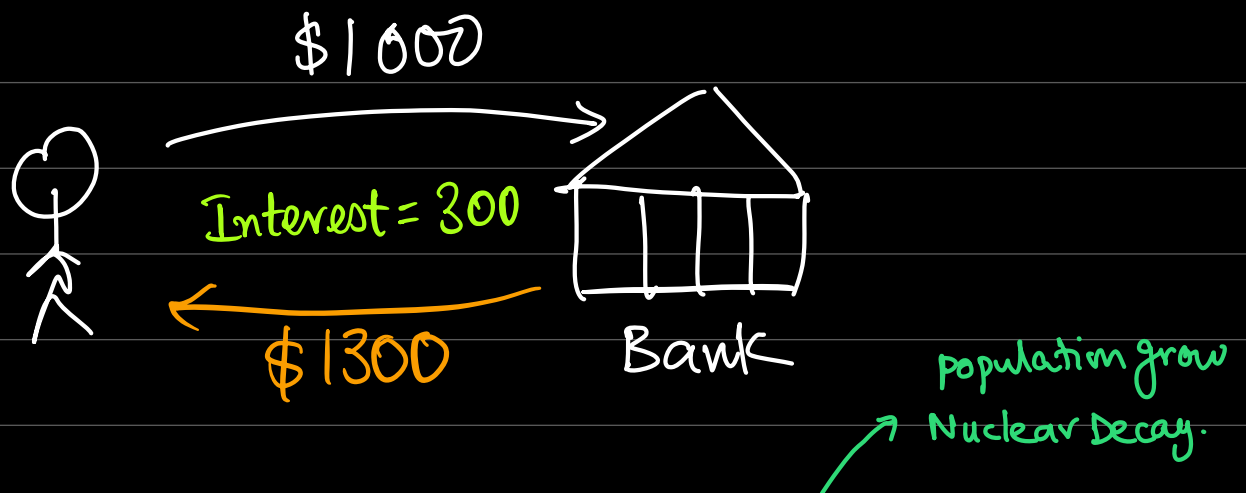
$$120x = 60 \times 100$$

$$x = \frac{60 \times 100}{120}$$

$$x = 50$$

$$\text{Tax} = 60 - 50$$

Answer \$ = 10 [2]



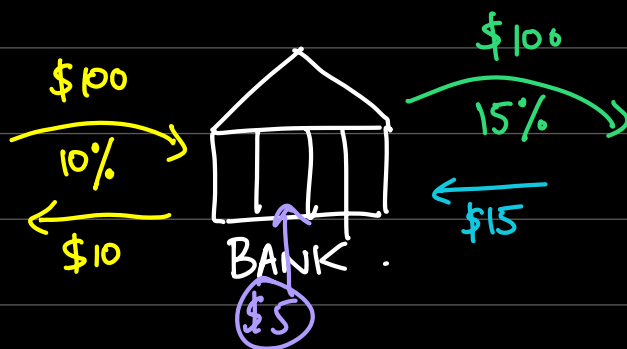
SIMPLE
INTEREST
BANK A = 10%

Today	\$1000	($1000 \times 10\% = 100$)
	+ 100	
Year 1:	1100	
	+ 100	
Year 2:	1200	
	+ 100	
Year 3:	1300	

COMPOUND
INTEREST
BANK B = 10%

Today	\$1000	($1000 \times 10\% = 100$)
	+ 100	
Year 1:	1100	($1100 \times 10\% = 110$)
	+ 110	
Year 2:	1210	($1210 \times 10\% = 121$)
	+ 121	
Year 3:	1331	

INTEREST HARAM HOTA HAI!



SIMPLE INTEREST

$$I = \frac{PRT}{100}$$

TYPE 1: STARTING AMOUNT AND INTEREST RATE GIVEN

$$\left[\begin{array}{c} \text{STARTING} \\ \text{AMOUNT} \end{array} \right] \times \left[\begin{array}{c} \text{PERCENTAGE} \\ \text{INTEREST} \end{array} \right] = \left[\begin{array}{c} \text{INTEREST} \\ \text{FOR ONE COMPLETE} \\ \text{YEAR.} \end{array} \right]$$

Q Ali invests ^{STARTING} \$4000 in a bank at ^{rate} 10% Simple interest for 4 years. Find.

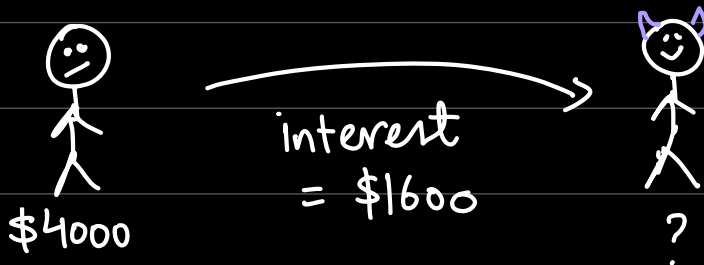
(i) Total amount of interest earned in 4 years.

$$4000 \times 10\% = 4000 \times \frac{10}{100} = \$400 \text{ interest for one year}$$

x 4 years

$$\text{Total Interest} = 1600$$

(ii) His final bank balance at end of 4 years



4000

+ 1600

$$\text{Final Bank Balance} = 5600$$

Q Ali invest ^{STARTING} \$600 in a bank at ^{Rate} 20% Simple interest for 8 months.
Find the interest earned in 8 months.

$$600 \times 20\% = 600 \times \frac{20}{100} = \$120 \text{ interest for } \overset{12 \text{ months}}{\text{one year.}}$$

Interest Months

$$\begin{array}{cc} 120 & 12 \\ x & 8 \end{array}$$

$$12x = 120 \times 8$$

$$x = \frac{120 \times 8}{12}$$

$$x = 80$$

TYPE 2: STARTING AMOUNT MISSING.

SIR ZAIN'S FAV BOXES.

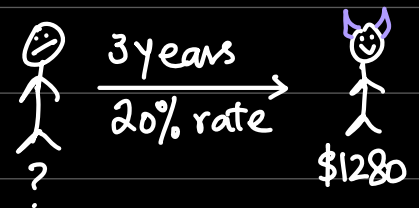
Q Ali invested some amount in a bank at 20% Simple interest. Given that he had \$1280 at end of three years, find the starting amount he invested.

	Before	After
%	100	160
\$	x	1280

$$160x = 1280 \times 100$$

$$x = \frac{1280 \times 100}{160}$$

$$x = 800$$



Note: Percentage interest rate is for ONE YEAR.

In box for percentage we add rate as many times as number of year.

e.g. we added 20% three times because of 3 years.

TYPE 3, INTEREST RATE MISSING:

Q Ali invests \$800 in a bank at simple interest. His final bank balance after 2 years is \$1120. Find the percentage simple interest.



$$\text{Interest for 2 years} \Rightarrow 1120 - 800 = \$320$$

$\div 2 \text{ years}$

$$\text{Interest for 1 year} = \$160$$

$$\text{Percentage Interest} = \frac{\text{Interest for 1 year}}{\text{original (old)}} \times 100 = \frac{160}{800} \times 100 = 20\%$$

COMPOUND INTEREST (Mostly comes with calculator).

$$F = P \left(1 + \frac{r}{100} \right)^n$$

↓ ↓ ↑ → no of
Final Present Rate Years.
Bank Value
Balance (STARTING)
 AMOUNT

$$F = P \left(1 + \frac{r}{100} \right)^n$$

THIS FORMULA IS USED:

- 1- COMPOUND INTEREST
- 2- EXPONENTIAL GROWTH.

Q. Ali invests $\overset{P}{\$4000}$ in a bank at $\underset{n}{10\%}$ compound interest for $\underset{n}{4}$ years.
Find:

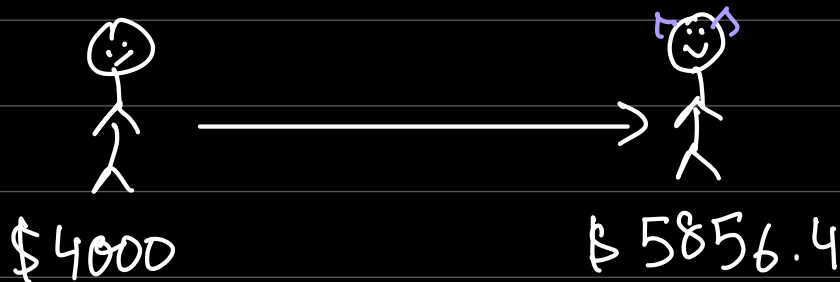
$\overset{F}{\text{ii) Final bank balance}}$ at end of 4 years

$$F = P \left(1 + \frac{r}{100} \right)^n$$

$$F = 4000 \left(1 + \frac{10}{100} \right)^4$$

$$F = 5856.4$$

ii) Total interest earned in 4 years.



$$5856.4 - 4000 = \boxed{1856.4}$$